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EXAMINER

CANTELMO, GREGG

ART UNIT PAPER NUMBER

1745

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/827,843

Applicant(s)

ONG ET AL..

Examiner

Gregg Cantelmo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 16-28 is/are rejected.
- 7) ☒ Claim(s) 12-15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. In response to the request for reconsideration received February 2, 2004:
 - a. Claims 1-28 are pending;
 - b. The prior art rejections of record stand in light of Applicant's arguments.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-11, 16-21 and 25-28 are rejected under 35 U.S.C. 102(b) as being anticipated JP 09-326259-A (JP '259).

JP '259 discloses a solid oxide fuel cell (abstract), comprising: a planar first and second interconnects (separators) that allows a first gas to flow therein; a planar ceramic cell between and adjacent to the two interconnects (Figs. 4a and 4b) a plurality of gas tubes 22-25 in gas communication with said ceramic cell, said gas tubes comprising: a gas inlets 22 and 24 in communication with respective gas outlets 23 and 25 (Figs. 4a and 4b as applied to claims 1 and 16).

At least one of said first and second gas outlets comprise a tube affixed to at least one of said first and second separators, i.e., interconnects (Figs. 4a and 4b as applied to claim 2).

At least one of said first and second gas outlets comprise a plurality of openings in at least one of said first and second interconnects. The interconnects having a plurality of openings (Fig. 6 as applied to claim 3).

The first and second gas inlets have cylindrical shapes (Figs. 4a and 4b as applied to claim 4).

The first gas inlet is affixed adjacent an intersection of two sides of said first interconnect and said second gas inlet is affixed adjacent an intersection of two sides of said second interconnect (Figs. 4a and 4b as applied to claim 5).

The first gas inlet is affixed at a middle area of a side of the central first interconnect and said second gas inlet is affixed at a middle area of a side of the central second interconnect (Fig. 4b as applied to claim 6).

The gas channels 22-25 are disposed parallel to one another (Figs. 4a and 4b as applied to claim 7).

The first gas inlet is disposed substantially perpendicular to said second gas inlet (Figs. 4a and 4b as applied to claim 8).

The circular tubes are straight as shown in Fig. 4b and thus have a straight shape (as applied to claim 9).

The gas tubes are T-shaped (Fig. 4b as applied to claim 10).

The tubes have a cross member portion and an inlet portion (Fig. 4b as applied to claim 11).

Each interconnect has 4 sides (Figs. 4a and 4b as applied to claims 17 and 18).

Each interconnect are adjacent to each other on opposite sides of the fuel cell (Figs. 1 and 3 as applied to claims 19 and 24).

The fuel inlets and outlets are secured in the interconnects (Fig. 4b as applied to claims 20 and 25).

The fuel and oxidant is flown in a cross pattern across the cell and a co-flow pattern along side the cell (Figs. 4a and 4b as applied to claims 21, 26 and 28).

Response to Arguments

4. Applicant's arguments filed February 2, 2004 have been fully considered but they are not persuasive.

Applicant argues that the prior art does not teach of a unitized solid oxide fuel cell. Applicant states that the term unitized is described in the specification as "intended to generally mean a self-contained fuel cell that can be replaced from a fuel cell stack without impairing the performance of the overall stack."

The underscoring was made by the Examiner herein to emphasize that first this description is found in the specification and not in the claims and therefore not expressly relevant to the invention as claimed. Second the specification does not require that the term unitized is limited only to the description in the specification. For these reasons, the term unitized as stated in the claim is not limited to the manner in which the

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specification generally describes a term. Therefore this argument is not germane to the claimed invention, is not persuasive and the rejection stands as drawn to this argument.

Applicant additionally argues that the gas inlets are designed to allow gas to flow through the electrode as opposed to adjacent a ceramic cell.

The gas inlets as shown in Figs. 4a and 4b are designed to allow gas to flow through the separators which are disposed about a plurality of solid oxide fuel cells (having a ceramic electrolyte therein). A separator is not an electrode. The gas flow as it passes through the separators is flow adjacent to the ceramic cell as shown in Figs. 4a and 4b and described in the translation of JP '259 in paragraph [0018]). The disclosure of the arrangements in Figs. 4a and 4b and the disclosure in paragraph [0018] are still held to teach of the claimed arrangement as set forth in the prior art rejection above, and the rejection stands.

The tubes are connected to the separators which separate the cells in terms of reactant flow but maintain electrical connection along the stack of cells (as drawn to claim 2).

Fig. 4b shows the inlets being substantially parallel. This being pointed out in the rejection above and again shown in Fig. 4b as applied to claim 7.

The gas tubes in Fig. 4b clearly have a T-shape as drawn to claim 10. A T-shape configuration, as shown therein, has a cross-member portion which runs parallel to the stack of cells and an inlet portion from the cross-member portion to each separator of the stack (Fig. 4b as applied to claim 11).

The Examiner concedes that JP '259 does not teach of the outlet and inlet arrangement as recited in claim 22. This should have been readily apparent in light of the 103 rejection of claims 22 and 23 below as applied to JP '259.

Fig. 4a shows a fuel inlet 24 on a first side of the separator (interconnects adjacent cells), a fuel outlet 25 on a third side of the separator, an oxidant inlet 22 secured on the second side of the separator and an oxidant outlet 23 secured on the fourth side of the separator as applied to claims 27 and 28.

For the reasons set forth above and absent clear and convincing arguments that JP '259 does not anticipated the claimed invention, the prior art rejection stands.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, 9, 16-20 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 04-342439-A (JP '439).

JP '439 discloses a solid electrolyte fuel cell comprising: planar first and second interconnects 9 and 11 disposed between a ceramic electrolyte (abstract and Figs. 2 and 3), gas tubes 6 and 7 are connected to respective interconnects 9 and 11 (Fig. 3 as applied to claims 1 and 16).

The gas outlets comprise tubes 6 and 7 (Fig. 3 as applied to claim 2).

A plurality of openings are in the interconnects 9 and 11 (Figs. 2 and 3 as applied to claim 3).

The gas flows are perpendicular to one another (Fig. 3 as applied to claim 8).

The tubes 6 and 7 have a straight shape (Fig. 3 as applied to claim 9).

The interconnects includes 4 sides (Figs. 2 and 3 as applied to claims 17 and 18).

The interconnects 9 and 11 are adjacent to one another on opposite sides of the cell 10 (Figs. 2 and 3 as applied to claims 19 and 24).

The outlets are secured on the second sides of the interconnects (Fig. 3 as applied to claims 20, 25 and 27).

The fuel is flown in a cross flow pattern (Fig. 3 as applied to claim 26).

The differences between JP '439 and claims 1, 4, 5 are that JP '439 does not show first and second gas inlets connected to respective interconnects (claims 1 and 16), that these inlets have cylindrical shapes (claim 4), that the gas inlets are affixed to respective intersections of two sides of respective interconnects (claim 5, of the inlets affixed at a middle area of respective sides of the interconnects (claim 6), of the shapes of the inlet tubes (claim 9), of the inlet and outlets being secured on opposite sides of the interconnects (claims 20, 25 and 27).

JP '439 discloses means 6/15b and 7/15a for exhausting gases across the span of the fuel cell width. One of ordinary skill in the art would have found it obvious to use the same configuration for the fuel and gas inlets as the fuel and gas outlets and dispose these inlets on the sides opposing the gas outlets since it would have provided

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means for supplying fuel and oxidant gases to the respective interconnects and flow these gases across the fuel cell (as applied to claims 1, 4-6, 9, 16, 20 and 25).

Response to Arguments

7. Applicant's arguments filed February 2, 2004 have been fully considered but they are not persuasive.

Applicant argues that the prior art does not teach of the a unitized solid oxide fuel cell. Applicant states that the term unitized is described in the specification as "intended to generally mean a self-contained fuel cell that can be replaced from a fuel cell stack without impairing the performance of the overall stack."

The underscoring was made by the Examiner herein to emphasize that first this description is found in the specification and not in the claims and therefore not expressly relevant to the invention as claimed. Second the specification does not require that the term unitized is limited only to the description in the specification. For these reasons, the term unitized as stated in the claim is not limited to the manner in which the specification generally describes a term. Therefore this argument is not germane to the claimed invention, is not persuasive and the rejection stands as drawn to this argument.

Applicant additionally argues that it would not have been obvious to one of ordinary skill in the art to have fuel inlets and outlets on opposing sides of the cell and air inlets and outlets on the remaining opposing sides of each fuel cell.

The Examiner respectfully disagrees.

The significant difference between Applicant's position and the Examiner's position is the interpretation of the term "unitized" as stated in the claim.

Again as discussed above, it is the Examiner's position that Applicant is reading the specification into the claim and that the claim, while reciting the term unitized, does not provide sufficient description therein so as to limit it in the manner Applicant argues. The term "unitized" does not specifically limit to a single cell and can be reasonably interpreted as a stack of cells, the stack being a unit.

With that, the obviousness rejection set forth above is not to affix inlets and outlets to each cell in the stack but to affix the inlets and outlets on opposing sides of the stack of cells. Again the stack of cells being a "unitized" structure as a single stack. In this manner, Applicant's arguments are not persuasive since they do not address the rejection in the manner in which it is applied.

In addition, while Applicant argues that the rejection would not have been obvious, Applicant fails to provide any evidence or reasoning to support their position. Therefore merely stating that the modification would not have been obvious alone is construed to be the opinion of the Applicant.

JP '439 discloses means 6/15b and 7/15a for exhausting gases across the span of the fuel cell width. One of ordinary skill in the art would have found it obvious to use the same configuration for the fuel and gas inlets as the fuel and gas outlets and dispose these inlets on the sides opposing the gas outlets since it would have provided means for supplying fuel and oxidant gases to the respective interconnects and flow these gases across the fuel cell (as applied to claims 1, 4-6, 9, 16, 20, 25 and 27).

Applicant argues claim 28 to JP '439 it is noted that claim 28 is not included in the rejection and any arguments to such are irrelevant.

For the reasons set forth above and absent clear and convincing arguments that JP '439 does not anticipated the claimed invention, the prior art rejection stands.

Claim Rejections - 35 USC § 103

8. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '259 in view of JP 57-138782-A (JP '782).

The teachings of claims 16-19, with respect to JP '259 have been discussed above.

As discussed above the fuel and oxidant are co-flown alongside the fuel cells (Fig. 4b as applied to claim 23).

The difference not yet discussed is of disposing the fuel inlet and outlet on the same side of the interconnect and the gas inlet and outlet on the same side of its respective interconnect (as applied to claim 22).

Note this return arrangement provides fuel and oxidant flows which are both co-flow and counter-flow (Fig. 4).

JP '782 discloses that it is known to configure the fuel inlet and outlet on a single side of the interconnect and the oxidant inlet and outlet on a single side of the opposing interconnect (Fig. 4).

The motivation for providing this arrangement is that it 4 reduces the complexity of the system. Furthermore by providing a u-shape to the flow paths it increases the

time of exposure of the fuel and oxidant to the fuel cell thereby increasing the gas utilization efficiency of the fuel cell.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '259 by configure the fuel inlet and outlet on a single side of the interconnect and the oxidant inlet and outlet on a single side of the opposing interconnect since it would have reduced the complexity of the system and since providing a u-shape to the flow paths would have increased the time of exposure of the fuel and oxidant to the fuel cell thereby having increased the gas utilization efficiency of the fuel cell.

Response to Arguments

9. Applicant's arguments filed February 2, 2004 have been fully considered but they are not persuasive.

The arguments to JP '259, discussed above, are incorporated herein.

Applicant additionally argues that it is not entirely clear that JP '782 discloses the configuration of claims 22 and 23. Applicant does not further express or explain this position.

The Examiner respectfully disagrees for the reasons set forth in the rejection above.

JP '782 discloses that it is known to configure the fuel inlet and outlet on a single side of the interconnect and the oxidant inlet and outlet on a single side of the opposing interconnect (Fig. 4).

Further the placement of the inlets and outlets as described in claims 22 and 23 is held to be a rearrangement of parts. It has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70.

Allowable Subject Matter

10. Claims 12-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

See item 16 in the office action mailed May 23, 2003, incorporated herein. As with Chen, neither JP '259 nor JP '439 teach or suggest the cross member arrangement as recited in claims 12 or 14.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo
Patent Examiner
Art Unit 1745

gc

A handwritten signature in cursive script, appearing to read "Gregg Cantelmo".

March 5, 2004